DOCUMENT RESUME

ED 481 776 JC 030 567

TITLE	Canadian Colleges and Institutes and Small- and Medium-Sized Enterprises, Productivity at Work.
INSTITUTION	Association of Canadian Community Colleges.
PUB DATE	2003-02-00
NOTE	30p.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	Business; *Community Colleges; Community Programs; Educational Improvement; Partnerships in Education; Public Sector; School Business Relationship; Shared Resources and Services; Two Year Colleges
IDENTIFIERS	*Canada

ABSTRACT

This document was prepared by the Association of Community Colleges in order to describe the relationship between colleges and small- and medium-sized enterprises in Canada. The ACCC collected information for this survey from the 150 Canadian colleges by conducting a literature/data review and a survey of member institutions in addition to on site interviews for certain selected schools. The document places emphasis on trends, inhibiting factors, and future direction of the relationships with the SME sector. The document is divided under the most common areas characterizing SME-college/institute interaction. Some of these common areas are: (1) skills development equation; (2) SMEs and colleges in rural and remote communities; (3) expanding virtual relationships; (4) product development, business incubation, and technology commercialization; (5) international connections and trade promotion; and (6) collaborative approaches. The document discusses in which specific ways SME is involved in college operations and discusses trends among the various community colleges. Based upon the analysis of the success factors and current trends that shape the relationship between community colleges, the future direction of these relationships are characterized by certain factors, such as higher numbers of Aboriginal SMEs and increased connectivity to rural and remote areas. (MZ)

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Canadian Colleges and Institutes & Small- and Medium-Sized Enterprises

Productivity at Work

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Association of Canadian Community Colleges

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February 2003

Introduction ▶

The Association of Canadian Community Colleges (ACCC) is the national and international voice of over 150 community colleges, institutes of applied science and technology, cégeps and university-colleges. These institutions, commonly referred to as colleges and institutes, are firmly rooted in the 900 communities they serve and are recognized as flexible, state-of-the-art learning organizations that respond to industry and business needs.

To define and capture the nature of the relationship between colleges and small-and medium-sized enterprises (SMEs) in Canada, the Association conducted a literature/data review and a survey of member institutions. Each institution was asked to list the types of relationships it maintained with SMEs and characterize a successful college/institute/SME relationship. In addition, a series of key informant telephone interviews were held with 25 college resource people to capture the breadth and depth of the relationships colleges/institutes have with SMEs in the regions they serve. Particular focus was placed on trends, inhibiting factors and future direction of the relationships with the SME sector. On-site interviews were also conducted with four colleges as well as a team interview with three college presidents who provide leadership to provincial associations. Similar interviews were held with provincial/regional associations, the ACCC Serving Rural and Remote Communities Task Group and the Forum for International Trade Training.

This paper provides a summary and analysis of the literature/data review, the nationwide survey and the interviews, from the college perspective. To allow adequate coverage of the issues, the paper is organized under the most common areas characterizing SME-college/institute interaction.

The Skills Development Equation ▶

A growing number of SMEs recognize their local college or institute as a provider of high quality, customized training. For example, new software products and systems are continually introduced to the workplace, as are regulatory changes requiring skills upgrading and certification, and colleges are viewed as a primary provider of functional skills upgrading and certification for SME employees. In rural and Northern areas, the local college is often the only source of technical skills training and the only mechanism to assist in ensuring that rurally based SMEs are functioning on par with marketplace demands.

Many employees and owners of SMEs are graduates of the college system, and they look to their local college to provide a supply of high-quality, work-ready graduates. SME professionals are an excellent source of current knowledge of the skill sets needed for the workplace and can often be found as part-time instructors in the college continuing education system and as guest lecturers in the full-time programs.

All colleges maintain Program Advisory Committees which consist of representatives from business, industry and the college to provide input and guidance to the curriculum development process and ensure that the skills and competencies taught are relevant and up-to-date. Many institutions must have a Program Advisory Committee already in place, with SME representation, in order to obtain provincial funding for a new program.

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Colleges and institutes also provide training for seasonal workers, such as those involved in the tourism and hospitality sector, as well as English and French language training for new immigrants to ready them for employment or as SME owner/operators. The provision of facilities and resources supporting business incubation for start-up ideas and new product lines, and specialized, flexible SME staff training are also recognized characteristics of the supply side of the skills equation.

For example, Camosun College offers standard SME staff training in bookkeeping, the principles of buying, inventory, transport and logistics; payroll certificate courses; sales and marketing; and, financial management. Local SMEs, such as Archipelago Marine Research, Monk Office Supply, Albion Fisheries and Grant Thornton, buy modules of a Leadership Development Certificate program to provide workplace-related training for staff.

Colleges and institutes also offer numerous courses certified by external organizations. For example, Humber College offers a Payroll Management Certificate program certified by the Canadian Payroll Association, a Property Management Certificate certified by the Institute of Housing Management, and a Chartered Insurance Professional program certified by the Insurance Institute of Canada, to name a few. These courses are of particular appeal to SMEs. Parkland Regional College responds to the increasing demand for safety training and accreditation, including Transportation of Dangerous Goods, Workplace Hazardous Materials Information System (WHMIS), and First Aid certification. The Humber College Plastics Training Centre has worked with clients such as Blau Autotech Inc., Mitchell Plastics Ltd., Plydec and Textron Automotive Interiors, and car manufacturers, to supply Injection Moulding Occupational Certification and remedy the shortage of training operators, material handlers, technicians and plastics engineering technicians in the plastics industry.

Colleges and institutes offer programs in entrepreneurship development as well as credit and non-credit courses for entrepreneurs, small business owners and managers and non-profit enterprise management, ranging from concept and business plan development and operationalization to financial management and costing to marketing etc.

Other entrepreneurship-related initiatives include the Student Connections Program, funded by Industry Canada as part of the Youth Employment Strategy, which provides SMEs with assistance in understanding the benefits of using information and communications technologies in their business practices and provides college and university students with short-term work experience. Since the program began in 1996, over 4,500 college and university students have been hired and more than 117,000 clients have been trained. On-going third-party evaluations indicate that more than 90 percent of SME clients believe that they received practical instruction that improved their use of information technology. Furthermore, more than 80 percent felt they gained information and/or learned skills that are relevant to their businesses.

Student Connections also provides an additional element to the existing linkage between the academic institution and the small business community through its relationships with local chambers of commerce and boards of trade.

Confederation College's Small Business Counselling Certificate Program provides practicing business counsellors and advisors with an opportunity to acquire the essential business tools necessary to efficiently qualify new business start-up proposals and effectively analyze problems and opportunities of existing businesses.

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Partners of Choice: SMEs and Colleges in Rural and Remote Communities ▶

The majority of firms operating in Canada's rural and remote communities are small enterprises, with these areas home to a significantly lesser number of large employers than in urban centres. As such, colleges and institutes are often the partners of choice for SMEs operating in non-urban settings. Colleges and institutes serving rural and remote areas offer many of the same services as the urban-based institutions. But, they must do so in a climate characterized by an environment dominated by smaller firms and the likelihood that these institutions are more susceptible to changing provincial/ territorial and federal granting mechanisms and less access to funding opportunities. Rural and remote colleges may acquire expertise from further afield to meet specific SME community needs – an additional cost factor.

No Boundaries: Expanding Virtual Relationships ▶

As more SMEs conduct components of their business operations through electronic means, the majority of colleges and institutes are training graduates in relevant and emerging fields. Many institutions offer e-business, e-commerce; on-line and distributed learning packages and other elements of import to local, regional and, in some cases, international SMEs.

For example, SMEs in Newfoundland and Ireland are one step closer to reaching the world thanks to a new "electronic library" developed by the Distributed Learning Centre of the College of the North Atlantic and a local SME, Media Touch Technologies, in partnership with Memorial University of Newfoundland and the Open Learning and Information Network.Fifteen on-line modules were designed to teach entrepreneurs in Ireland and Canada how to become e-business ready and form part of the E-Learning Repository for Small Business being developed by Operation Online. The project is funded through the Canada/Newfoundland Agreement on Economic Renewal.

Holland College has conceptualized the E-Business Smart Storefront which aims to remove barriers to SMEs' uptake of the advantages of e-business by demystifying and demonstrating the full scope of e-business opportunities through the use of virtual and operational e-business sites of actual PEI companies. The Storefront will also conduct preliminary and comprehensive assessments of individual objectives and needs. In addition, the Virtually Anywhere Synchronous Technology (VAST) Collaboration was developed by Holland College to leverage the use of videoconferencing, computer tools and real-time communication in expanding the capacity of Atlantic Canada's predominantly SME environment and encourage "virtual clusters" of SMEs. Using these technologies to contract work and communicate with SME clients, students will gain leading-edge "e-work" skills and SMEs will benefit from the opportunity to explore potential applications to their operations.

Bringing it to Market: Product Development, Business Incubation and Technology Commercialization ▶

Colleges and institutes also serve as a development and testing ground for SMEs, whose ability to develop or adapt new products, processes, and business models is key to the economic prosperity

and international competitiveness of both urban and rural Canada. Approximately 65 colleges and institutes, both urban and rural and from across the country, work with business and industry to:

- Develop new or enhanced products and processes
- Develop prototypes
- Research, adapt and commercialize new knowledge and technologies
- Simulate, test and analyze products and processes
- Conduct market and product feasibility studies
- Develop marketing strategies to help businesses plan and expand
- Develop and incubate new business by providing access to equipment, technologies, "pilot plants" and expert staff

Many colleges offer state-of-the-art market technologies and the latest in scientific laboratories for research. With the value of college and institute applied research and development estimated at $100-$200 million[1] annually, students and faculty benefit from exposure to new ideas and methodologies, bringing this knowledge to the workplace and the classroom, respectively.

For example, the Northern Centre for Advanced Technology (NORCAT) of Cambrian College was created in 1995 to support the mining sector and has since assisted in the creation of over 400 jobs and 36 new SMEs. It has also completed over 140 projects, 80 percent of which are commercialized or deployed in the marketplace through SMEs in some manner. NORCAT assisted in product development for over 60 SMEs, and provided over 2,000 SMEs with Occupational Health and Safety training and consultations. SMEs also sit on the Board of Directors of NORCAT. As part of the Canadian Space Agency/MD Robotics "Mar Science Laboratory" subsurface sampling project, the NORCAT team, led by a local SME, Electric Vehicle Controllers (EVC) is developing the unique CanaDrill – a light weight, autonomous all electric dry running drill designed to explore microgravity terrains.

University College of the Cariboo (UCC) worked with VS Visual Statements to develop crime scene and accident management software. UCC also delivers the Value-Added Wood Products Technology Transfer program with Forintek Canada Corp., and works with Technology Kamloops and Aquavent to raise early stage seed capital for commercialization. Graduating students of the UCC Computer Automated System Technicians Program undertake demonstration projects with companies such as Fire Trol, Unique Tire Recycling, Canwood Furniture, Bear Brewing, Gibraltor Mines, SureGrip Controls, Pollard Banknote, Weiser Lock Company, Innovative Medical Technologies, Barrett Manufacturing, Okanagan Dried Fruit and Dynoflex Corporation, to name a few.

Cégep de la Pocatière has undertaken 800 industrial research and development projects for approximately 200 firms since 1983 in the area of mechanics, mechatronics, electronics and optoelectronics. Red River College developed a software product – Graphic Realtime Analysis Program for Engineering (GRAPE GBW32) - which is now used by engineering firms such as Oswald Engineering and Westinghouse Hanford. Okanagan University College, in collaboration with Tolko Industries Ltd., Riverside Forest Products and Pacific Regeneration Technologies, determined the best container type for maximum root stability of lodgepole seedlings in reforestation efforts. The Northern Alberta Institute of Technology instructors and students worked with TRLabs and one of its members, Vital Telecon, to develop and test means to identify voice, fax and modem data being carried through networks.

[1] Industry Canada / Association of Canadian Community Colleges Survey of College and Technical Institutes' Applied Research and Development Activity, March 2002.

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The University-College of Cape Breton (UCCB) Microelectronics library provides infrastructure for SMEs to conduct applied research while the Department of Economic and Technological Innovation provides direction regarding IP, patent and other commercialization processes. UCCB's Technology Enterprise Centre has invested more than $460,000 in incubation services for seven local SMEs since 1998 while the Small- and Medium-Size Enterprise Institute (SMEI) provides faculty and students with a base from which research into the SME sector can be undertaken.

The College of the North Atlantic Manufacturing Technology Centre allows Newfoundland manufacturers and entrepreneurs, typically SMEs who lack the finances, equipment and physical resources, to transform ideas into competitive and profitable products through product and process simulation, student placement, work-term placements and longer-term applied technical assistance, research and development. Clients have included High Point Industries, Eastern Industries Limited, McDonald's Fibreglass, Institute for Marine Dynamics, Griffith's Guitars International, Moss Innovations, Weil Winery Ltd., Teltech Canada, Oceanic Consulting Corporation, Baltic Services Inc., ACAN Windows Ltd., Avalon Hydraulics and CHC Composites Inc., to name but a few.

International Connections and Trade Promotion ▶

Many colleges and institutes have international projects and connections that lend, and gain, support from SMEs. Colleges and institutes are represented on the Department of Foreign Affairs International (DFAIT) Education Marketing Advisory Board and promote the export of Canadian education and training expertise as well as technology transfer overseas. In addition, many colleges support student internships abroad with SMEs. For example, Niagara College's Ecosystem Restoration Project allows graduates to assist in the establishment of revenue-generating eco-tourism, ecology and community development SMEs in Ecuador, South Africa and Brazil.

Thirty-one colleges and organizations offer on-campus training for the Forum for International Trade Training (FITT). The FITT curricula examines cross-cultural awareness and business practices and trade and export regulations as well as a broad cross-section of courses designed to equip Canadian workers with the capacity to interact, perform and produce in an increasingly international business forum.

Yet another example involves Confederation College as the host of the Northwest Enterprise Centre which offers the Market Expansion International Program with the Northern Ontario Enterprise Alliance. The Program involves professional business seminars, small industry-specific workshops, on-site advisory sessions, domestic and international match-making, in-country training sessions and business networking. Clients are companies exporting to one country and looking to expand into another, those interested in international trade with export-ready products or services, and those who will export in the medium- to long-term. The Market Expansion International Program includes a 15-day overseas trade mission.

Strength in Numbers: Collaborative Approaches ▶

Colleges and institutes and business and industry have worked closely together in the past to meet national challenges, such as metrification in the mid-1970s. Today, colleges and institutes and business and industry have become increasingly motivated to adopt consistent, collaborative, sector-wide approaches to ensure that skills needs and challenges can be identified, mapped and met in an

appropriate timeframe that mitigates against crises and opts for pre-emptive action. While some colleges and institutes and SMEs work with the Sector Councils, true awareness of the Sector Council concept, and the links to SMEs, is perceived to be mostly limited to Central Canada although some Councils are in fact based in Western Canada. The ACCC networks of colleges linked to various Sector Councils have begun an initiative to strengthen knowledge transfer and linkages across the country.

Other forms of collaboration include joint industry-institute projects, programs and courses. For example, many institutions offer summer ESL and FSL Study Tours that often have a mix of college-based language training and SME-led activity such as eco-adventure tours, etc. Red Deer College held a joint Business Expo, created an interactive website in manufacturing, and engaged in a competitive intelligence workshop with local SMEs and the College Library. Aurora College has a physical SME presence on campus for the collaborative delivery of training while Lambton College works with SMEs through community-based committees and SME networks to provide non-traditional, on-site training and generate feedback to the College's part-time and full-time programming.

The collaborative approach can also strengthen local economic development initiatives. For example, Centennial College is home to the Scarborough Chamber of Commerce while the Institute for Global Entrepreneurship and Electronic Commerce at Confederation College worked in partnership with the Northern Ontario Association of Chambers of Commerce to survey more than 5,000 SMEs in Northern Ontario to look at problems with infrastructure and the degree to which e-commerce is used in business.

Other examples of collaborative initiatives include setting up learning centres in close proximity to Industrial Parks or Business Centres to service the needs of SME clusters, such as the Algonquin Management Centre which serves the Ottawa business community. Con*nect, a grouping of Ontario colleges, is coordinating a strategic, collaborative response to training needs within the aerospace industry by bringing together all Ontario colleges offering aerospace training, the Ontario Aerospace Council, the Canadian Aviation Maintenance Council as well as the Quebec association and the Ministry of Economic Development and Trade. Collège de Valleyfield, Cégep de Granby, Champlain Regional College, Collège Édouard-Montpetit, Cégep de Saint-Hyacinthe, Cégep Saint-Jean-sur-Richelieu and Cégep de Sorel-Tracy together offered a month-long series of activities, including conferences and workshops focused on promoting the importance of investment in human resource development throughout the region.

Developed at the request of local industry, Red River College provides an entry-level Manufacturing Certificate program involving Canadian Manufacturers and Exporters, Gerdau MRM Steel, Custom Castings and Manitoba Education and Training. St. Lawrence College participates in the Kingston Technology Council focused on stimulating and supporting the economic growth of technology based companies in the Kingston region. The membership is predominantly SMEs and start-up ventures.

Douglas College works with a local business services firm, Headquarters, to offer off-site coordination services for training by the College while Sheridan College collaborated with the municipality of Oakville and the Oakville Economic Development Alliance to set up a digital media business incubator on the college campus. The Technology Transfer Centre Advisory Board for the incubator is comprised of representatives from the college, the town, the economic development office and SMEs.

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SME Involvement in College Operations ▶

The college system depends on SME involvement to remain current and proactive. Typically, SMEs are involved in college operations in the following ways:

- participation on the Board of Directors
- participation in Program Advisory Committees
- teaching part-time
- staff attending college
- providing guest lecturers
- presenting at conferences
- offering joint conferences or on-site events such as job fairs
- serving on various committees
- sponsorship of prizes etc.
- employing students
- offering work placements
- providing information/case studies for class projects
- donating equipment
- on-site instruction
- technology transfer
- skills training

Other areas of involvement are often specific to a particular college or institute and the unique relationships it cultivates with the local SME community.

Trends ▶

- Increasing partnerships between colleges and institutes themselves to offer training to industry clusters.
- Increasing use of virtual and electronic networks to promote and provide services to SMEs.
- Overall, partnerships with SMEs have grown substantially and opened up over the last decade. Industry partnerships have contributed to college growth and vice-versa, as have regional economic partnerships and the development of more SME networks.
- SMEs have become a major economic driver and are supporting the cross-Canada increase in entrepreneurship.
- Colleges and institutes have raised credibility levels with SMEs and are recognized as strong trainers by SME employees.
- The number of Program Advisory Committees within the college or institute continues to grow as program offerings expand.
- The number of SMEs looking to expand in terms of international technology transfer continues to grow.
- College growth has a direct relationship to SME relationships – both on credit and non-credit sides.
- Industry insisting on outcomes, competency-based training focusing college to plan outcomes rather than on historic curriculum.

- Colleges playing a neutral leadership role in informal SME networks.
- College faculty look at enhancing relationships, greater tendency to cooperate.
- To remain current, SMEs are increasingly linking with each other for training and human resource development initiatives, not just through Chambers of Commerce but through other sector associations, community development organizations and SME-initiated geographic clusters.

Success Factors ▶

- Trust, integrity established and time invested (due diligence) in developing and maintaining individualized and customized relationships
- Commitment at senior levels for all parties, formal agreements are an option
- Share the risks and find ways to resolve issues
- Articulated, reasonable expectations and defined roles and responsibilities for the college/institutes and the SME
- Ensure a relationship-based process between faculty, business and students – a coordinated internal process
- Mutual benefits, flexible but tangible results
- College provides an independent venue for applied research, can deploy land, equipment, facilities, resources to help start-up operations
- Stability, continuity and consistency in terms of college staff involved
- Internal financial and personnel support in the college, willingness to try "new things", service-oriented champions within the college who will make it work
- Meet immediate needs identified by SME
- Develop partnerships with other institutions
- Training may either be credentialled or structured so that recognition may be acquired at a later date

Future Directions ▶

Based on an analysis of the success factors and current trends guiding today's relationships between colleges/institutes and SMEs, the future direction of these relationships are characterized by the following:

- Engaging industry in strategic partnership models through formalized agreements
- Increasing the depth and reach of partnerships between colleges in response to SME needs and sectoral clusters
- Placing additional responsibility on industry to define training needs, view training as an investment
- Ensuring student internships, work-based training models
- Developing new delivery methodologies to reach smallest enterprises
- Colleges will become a hub or one-stop shop for SME expertise

- Higher numbers of Aboriginal SMEs
- Colleges will have to take a more formalized position relative to economic development within communities, they must step out in front of the parade and take leadership in this area
- Colleges will be discovered in terms of the resources, capacities and experience that they bring to SME development in Canada
- Increased networking, collaborative approach to marketing of college capacities using success stories and building storefront presence in communities
- Looking for national leadership, support for increased involvement of colleges in serving SMEs
- Just-in-time training, more competency-based outcome oriented training; multiple entry and exit points for some learners in certain fields, e.g. apprenticeship trades
- Models being developed, on-time training, workplace training (such as Testing of Workplace Essential Skills developed by Bow Valley College in Alberta and now spreading across the country)
- Virtual consultancies, on-line training, increased connectivity to rural and remote areas
- In collaboration with ACCC as the access point to the college system, Sector Councils will become even more involved in determining training outcomes and accreditation as well as furthering linkages to and between colleges and SMEs
- Sectoral groupings of SMEs, regional groupings to give strength and financial viability to training demand and supply, applied research considerations
- Increased product development, applied research initiatives as SMEs look to colleges due to growing technological capabilities on both sides
- Training a higher priority given increased exit from workforce of aging population across the country, especially in rural and remote areas, colleges can assist in recruiting to trades and other occupations
- SMEs will require the design and implementation of models e.g. a time release program
- Mechanisms to band small SMEs together to access affordable training
- Solid human resource planning, training and development assistance needed by SMEs

Inhibiting Factors/Opportunities ▶

- While the larger SMEs may have a Human Resources professional on staff, the majority do not have a dedicated human resource person, plan or allocated funds.
- Lack of funds for liaison, relationship building, human resource planning and assistance as well as marketing of college and institute services to SME communities.
- Economic realities of rural and remote communities: out-migration of youth, SMEs surviving day to day, the question of time, distance and facilities available in immediate locale.
- Increasing internal college capacity to meet demand.
- Keeping training up-to-date requires inflows of cash and equipment.
- SME fatigue in terms of partnership requests with colleges e.g. matching grant contributions, provincial funding requirements, etc.
- Lack of accessible external supports for Canadian SMEs.
- The governance and accountability structures of colleges and institutes may, in some cases, mean that they face some constraints in their relationships with SMEs. For example, colleges and

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institutes cannot move to purchase land or capital equipment at the same speed as the less constrained private sector.

- Some Boards of Governors have SME representation some do not. This may inhibit the vision of the institution with respect to institutional services to the SME community.
- In some instances, college collective agreements can be a hindrance in terms of availability of staff time, reallocation and assignment of staff and remuneration.
- Finding the specialized or niche expertise within faculty available or willing to take on reassignment, which may be exacerbated outside of urban centres.
- Limited instructional skills development for instructors from the SME community.
- Bringing rural and remote areas up to speed in terms of connectivity, government support.
- Lack of programs supporting SMEs in the area of the prototyping and product development
- SMEs face recruitment challenges.
- The needs of seasonal SMEs are often difficult to meet due to shorter operational periods.
- Language barriers for SME owners/employees whose first language is neither English nor French.
- Changes in management in college/institutes or SME can derail a partnership if not championed internally by others.
- Often require critical mass for training programs, how to provide specialized niche training for one or two employees given current time, cost and delivery constraints?
- Non-supportive government policies and changing priorities.
- While companies recognize the need to train and retrain, it is sometimes viewed as an expense rather than an investment. Having groups of people away for training causes great difficulties adjusting work schedules.
- SMEs can view investment in training employees as a risk. If the employee leaves the company after receiving training, the employer has a negative return on investment.
- Employees want training that is portable and recognized and frequently want laddering towards formal credentials.
- At times, SMEs do not collaborate in terms of cluster approaches to training due to the desire to acquire or retain a competitive advantage by obtaining individualized, customized training outside the cluster.
- There are no mechanisms for information sharing in terms of best practices in SME relationships with colleges and institutes.
- Broadband and highspeed connectivity are essential to the provision of skills development and/or upgrading, particularly in rural and remote communities. This technology is not always accessible due to funding constraints even though it provides the means through which regional and rural community colleges can provide cluster-based learning to smaller groups of SME employees in distributed locations and allow these companies to overcome geographic barriers and remain globally competitive.

Bow Valley College Case Study
TOWES (Test of Workplace Essential Skills) ▶

A partnership between an Alberta college and a British Columbia not-for-profit organization is giving businesses in Canada an important tool to help them become more profitable and productive.

Essential Skills

Many companies have realized that their greatest asset is their staff. Employees who are well trained can boost the bottom line through reduced error rates, reduced workplace injuries, less downtime and fewer workers' compensation claims – if they have the right skills. The Test of Workplace Essential Skills (TOWES – www.towes.com) compares an individual's skills against the requirements of specific occupations, identifying areas of competency and areas for further development.

"Essential skills are the Velcro to which all other training sticks," said Conrad Murphy, Business Leader, Business Development at Calgary's Bow Valley College. "Workers must first have the basic literacy and numeracy skills to understand the higher-level training and to make the training stick."

The Partners

Having specialized in adult education for over 35 years in Calgary and at campuses throughout southern Alberta, Bow Valley College places particular emphasis on practical learning solutions for the workplace and its commitment to training and development of the front-line workforce. In partnership with SkillPlan BC and the BC Construction Industry Skills Improvement Council, the College developed the Test of Workplace Essential Skills (TOWES), a nationally-recognized bank of test items that, collectively, form an assessment tool to measure essential skills in a workplace setting.

The Tool

TOWES enables employers to assess individual ability in the areas of reading text, document use and numeracy. These three key dimensions of literacy have been found to be closely linked to success in the workplace. "A lack of essential skills can sometimes be a hidden and draining factor on a business," says Murphy. "Front-line workers who have difficulty absorbing or understanding training on new processes or new technology can have a deficiency in essential skills. This affects vital areas of a business, including health and safety, errors in quality of production and can cause communication issues."

Using TOWES, employers are able to set reasonable and valid entry-level job requirements for positions within their companies. Until now, many employers have been using years-in-school or other credentials as proxies for ability. This can be unfair to other qualified individuals, some of them foreign-born, who have the skills but not the educational credentials in Canada. With TOWES, employers are able to accurately assess all candidates in order to find the best fit for the position.

Results from the test are delivered in a framework based on the International Adult Literacy Survey levels and are consistent from one practitioner to another and from one workplace to another. TOWES has undergone stringent validation and testing protocols. TOWES has also been extensively field-tested, both commercially and through demonstration projects. Commercial clients include BHP Diamonds in Northwest Territories, Keyano College and Suncor in Alberta. Demonstration project partners include the Saskatchewan Wheat Pool, the Halifax Employers Association and the Government of Alberta.

The Future

A new version of TOWES is in development. This version will serve as a ticket to employment; just as people use passports to travel abroad, people applying for jobs with participating employers would be able to use a TOWES ticket as a credential. People would acquire the credential in one of three ways: through publicly accessible test centers, largely housed out of community colleges throughout Canada, individuals would be tested and be able to access upgrading programs to improve their TOWES scores; through programs at organizations that provide work-focused training to the unemployed, TOWES testing would be integrated with training so graduates exit from their program with both a certificate and the TOWES credential; and, through K–12 school systems, TOWES and its related curriculum would be introduced into school systems in Canada, so that students would have a TOWES credential as part of their portfolio upon graduation.

HRDC and the Conference Board of Canada are just two high-profile organizations that have targeted the development of essential skills as a major issue affecting Canadian businesses and our economy. As part of its national skills agenda, HRDC is focusing on essential skills as part of its strategy to help Canada compete. By making TOWES available to employers, educational institutions and government, Bow Valley College and SkillPlan BC are working to ensure Canadian businesses have the employee base they need to succeed.

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College of the Rockies Case Study
Timber Frame Production Training Program ▶

The Craft

The craft of timber framing, joining large structural timbers with complex joinery using wooden dowels instead of nails, had become almost a lost art in British Columbia. Thanks to new programs at the College of the Rockies, the craft is seeing a renewed interest.

The Programs

For the last year, the College has offered three programs in timber framing at its campus located in Kimberley. The 40-hour Introduction to Timber Framing program provides students with hands-on instruction and practical experience as they build and raise a small timber frame structure. The full nine-week Timber Frame Production program educates students in the theories of contemporary and historic timber frame construction systems and provides the necessary training and practical experience to work in the timber frame industry. A one-week course on CADWORK specialized computer drafting software, that attracts employees of SMEs from throughout the Pacific Northwest, rounds out the College's program offering in timber frame construction.

In establishing the programs, the College of the Rockies responded to an identified growth market in the sector, as more and more baby boomers retiring to the country were looking to buy quality timber framed houses. The pegged joinery is stronger than conventional framing and the traditional method allows for the use of timbers as they come from a sawmill that may not be of consistent dimension. Canadian Timber Frames of Golden, B.C., the American Timber Framers Guild and CADWORK SA of Switzerland were instrumental in the development and launch of the programs in Kimberley.

The Projects

The College is also partnering with business and organizations in the community on a number of projects. Currently, the College of the Rockies is involved in the construction of a new Chamber of Commerce building for the City of Kimberley which includes a 2,000 square foot visitor information centre. Apprentices in various trades, as well as the contractors that support them will build the structure from wood sawn by students. A business from Lindsay, Ontario, Clarke Portable Sawmills custom made a sawmill for the students to cut local trees into timbers. Canadian Timber Frames helped draft the plans and source supplies, and CADWORKS provided an instructor to work with the students on a specialized timber framing drafting program. Other partners include over 200 small businesses in the community that support this initiative that will showcase the work of local apprentices and skilled craftsmen. The project is due for completion in June 2003.

The College is working with the City of Kimberly and the downtown business association to build a new bandshell in the centre of the town square, also due for completion in June. A 25-foot octagon, the bandshell is a complex structure to make and construction will involve many local apprentices and craftsmen.

The next project on the drawing board is called a Healthy Home. Slated for the summer of 2004, this project will see the construction of a timber frame structure with straw bale insulation incorporating alternative energy sources. The concept of an apprenticeship in and promoting the Healthy Home project is expanding the boundaries of the College. It is hoped the project will promote a skilled home-grown workforce and increase the number of small business in the region, while building environmentally sound structures which are both beautiful and earth friendly.

Although still in the developmental stage, the last project involves the creation of an "Apprenticeshop" that would see the College hiring former students to continue their apprenticeship under the guidance of a master timber framer. Currently, all timber frame apprentices trained by the College must move out of Kimberley in order to continue their training and structures in Kimberley are being built outside the region and shipped in. It is important to keep skilled craftsmen in the region to develop a value-added wood industry to replace the failed mining industry as the main source of employment and economic growth. The College and its partners such as the Columbia Basin Trust, the Ministry of Forests Small Business Wood Salvage Program, United Communities and Teckcominco will all come together to see this become reality.

The Success

The College of the Rockies timber framing programs are gaining in popularity with an ever increasing number of timber frame companies in B.C. sending their employees to Kimberley for training. One of only a handful of institutions in North America that offer this type of training, the College receives calls from potential students from across the continent. Graduates of the Timber Frame Production program are much sought after by timber frame companies due to their knowledge of the CadWorks drafting program.

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Institut de technologie agroalimentaire de La Pocatière Case Study
Applied Research and Technology Innovation ▶

Being a unique centre specializing in farm and agri-food training located in Eastern Québec, the Institut de technologie agroalimentaire (ITA) de La Pocatière has also adopted the mission to contribute to regional and technology development for agri-food businesses, mainly in the areas of agri-environment and enhanced competitiveness.

To achieve this mission, ITA has introduced an Applied Research and Technology Innovation Department which has the following objectives:

- To support business development by providing infrastructure, equipment and the professional and technical expertise of ITA staff and students;
- To revitalize professional and technical training by creating a synergy between training and innovation activities;
- To transfer research findings to business to improve performance and profitability, while respecting the principles that foster sustainable agriculture.

Achievements

ITA has conducted more than 70 projects over the past few years in various areas, including agri-environment (diffused pollution control, composting, liquid manure treatment systems), organic farming, agroforestry (windbreak, multi-resource development), geomatics, remote sensing, precision farming and agricultural computing. In addition to assisting industry with benefits from project outcomes, ITA activities have helped to create four new businesses in the region, including a business incubator, as well as numerous technical positions for young people who are settling in the area and participating in the local economy.

Examples of Recent Achievements

Agricultural Computing: The development of a bilingual software program called EnviroGram that assesses a firm's agri-environmental performance and compares the technical and economic performances of those applying environmental practices. This software is marketed by the Canadian Farm Business Management Council.

Composting: The development of methods for composting agricultural residues by mixing them with municipal organic residues to produce compost that can be used or sold by farm businesses. ITA received funding from the Canada Foundation for Innovation (CFI) for the development of a composting research unit. Three pilot projects are currently underway with farm businesses in the region and many others are interested in using the results.

Remote Sensing: The development of a fast, affordable method for using multi-spectral digital imaging to assess, in real time, the agri-environmental performance of farm businesses, develop a farming plan that incorporates the principles of resource conservation and monitor crop progress in quasi real time. System applications have been tested in several areas, with approximately 70 farm businesses participating in the project. Farm advisors, agri-environmental clubs and farming co-ops now want to use this newly-developed technology.

Precision Farming: The development of a system to manage localized and georeferenced application of liquid and solid manure based on plant requirements, soil fertility and compliance with environmental standards. Two prototypes have been developed and tested: one for a liquid manure spreader, the other for a solid manure spreader. Industry is interested in these prototypes and discussions on technology transfer are taking place. CFI provided a portion of the funding for this project.

Pollution Control: The development and assessment, in partnership with two privately-owned businesses, of a global management system to reduce the pollution from for water from crop lands that seeps into the water supply. This project also involves various subsystems to capture and reclaim fertilizing components from the water. In addition, with financial support from the CFI, research units on liquid manure treatment will be built in the near future.

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Kwantlen University College Case Study
Fashion Design & Technology Program ▶

Upon seeing the positive results of programs linking fashion design students and the local industry at student shows in London, England, instructor Julie Hobart was prompted to strengthen Kwantlen University College's ties with the apparel industry in British Columbia. The College's Fashion Design and Technology program began its *Industry Links* program in the fall of 1993.

The Program

Industry Links is a series of projects of varying lengths that partner Kwantlen's fashion students with industry professionals. Each year, the college links with three or four companies to provide an in-class project for fashion students based on the companies' market needs, with student evaluation provided by fashion professionals. Outside the classroom, individual students work with a local company as part of their final design project, in which they design and produce sample garments to meet the company's needs in consultation with company representatives. In addition, each third-year student is required to undertake a 300-hour internship with a local apparel design/manufacturing company. Participating companies also provide factory tours and offer classroom presentations and scholarships.

The Benefits

In the business world, *Industry Links* is called a win-win situation. Local businesses get to be involved in developing program curricula so that students can be better prepared as potential employees and can make the bridge between theory and practical experience. According to Mustafa Khan, President of West Coast Apparel, "the ability to shape and influence future generations of industry participants has been an enjoyable and rewarding experience. The objective is to impart practical, usable information to students during their practicums, so that they are fully prepared to enter the workforce with a clear understanding of what is expected."

Industry benefits considerably from being involved with students who bring a fresh approach, a willingness to learn and an eagerness to apply their skills by assisting in any way possible. Many Kwantlen design students educate their work placement employers in terms of software and digital technology, with several Vancouver-based companies having purchased computer software based on the programs that are used in the College. Companies have also benefited by using portions of the students' lines for upcoming seasons. Another benefit was described by Shirley Calla of West Coast Apparel, "from the company's perspective, this type of program provides a training period at no cost! If there is a successful match of student and company then it will ultimately be a successful project resulting in employment."

The Partners

Local businesses participating in *Industry Links* over the course of the program include: Aero Garment Ltd., BC Hemp Company, Board of Authority, Boys' Co., The Bridal Studio, Brown Eyed Girls, Club Monaco, Gordon Fabrics Ltd., Is It Legal, Koret Canada Inc., Limbo Clothing Co., Mountain Equipment Co-Op, N. Jefferson Ltd., NoZone Clothing Ltd., Planet X Clothing Co., Plum Clothing Company, Poor Boy Clothing Compagnie Inc., Roxanne Nikki, Vanitex Enterprises Inc., and West Coast Apparel.

The Student Benefits

For fashion design students, the industry connections are invaluable. Students need an opportunity to work in an industrial environment in order to appreciate how it functions and gain a better understanding of the variety of job possibilities. Through the *Industry Links* program, students learn to connect their ideas to the constraints and demands of the marketplace – an essential design skill. They have the opportunity to interact with industry representatives on a regular basis and are able to contribute to the product development process. Written evaluations from the practicum supervisors assist students in gaining an awareness of their ability to work in an industrial setting and highlight the areas that they need to further develop in order to be marketable. "Students have design and technical skills upon graduation. They need confidence to be able to use those skills. The practicum can provide this opportunity," said one supervisor. From the student's perspective, they learn that it takes a lot of organization and communication to run a business. Said one student, "Most importantly the program teaches us that as designers we cannot function as an island unto ourselves, we must be aware of all aspects of the business – production, planning/marketing and sales. We are part of everything."

The Awards

Industry Links has won two Apparel British Columbia's Joseph Segal Industry Awards for innovative use of equipment and technology and for making a substantial contribution to the growth of the local apparel industry. The fact that previous Fashion Design and Technology program graduates are starting their own businesses and participating on the industry side is a testament to the success of this program.

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Loyalist College Case Study
Strategic Blueprint for Economic Growth ▶

The Loyalist Training and Development Centre (LTDC) is the entrepreneurial training arm of Loyalist College. Beginning as a small enterprise in the early nineties, LTDC quickly gained repute as one of the most highly-respected training centres in the province. Small wonder that when the Quinte Economic Development Commission realized the need for a comprehensive strategy to address the changing labour force needs of manufacturing in the Quinte region, it selected the LTDC as its partner.

The Issue

Over the last two years, the Quinte area has become nationally recognized for a collaborative and innovative partnership approach in pursuing regional economic development and the establishment of an integrated human resource workforce development system. Known for its strong and highly-skilled manufacturing labour force, the effects of the changing economy on the Quinte area were making skilled employees increasingly difficult to find. The Strategic Blueprint for Economic Growth project was designed to ensure that the manufacturing sector continues to have an outstanding labour force and to provide information and employment opportunities for the local labour force, with a focus on youth.

The manufacturing sector was chosen as the target of the study as it is the largest business sector in the greater Quinte region in terms of economic and human resource impact. The manufacturing sector employs almost 13,500 employees directly - a significant proportion of jobs in the area. In addition to its size, manufacturing is the sector where companies at a local level have been most vocal about future workforce issues. It is estimated that the manufacturing sector's direct and indirect financial impact on the region is greater than $1 billion per year.

The Project

In the project development, one key factor identified for success was the need to have active participation by all stakeholders in the community. LTDC's reputation and experience in dealing with labour force development issues allowed them to access many local organizations. The study involved secondary school students, teachers, guidance counsellors and parents; post-secondary education and training providers; economic and business development organizations; related agencies and government ministries; as well as 268 manufacturing companies, 94 percent of which are small and medium enterprises. The LTDC assembled a strong team to effectively administer the design and delivery of the survey, the collection of the information, the coordination of interviews and the creation of the final report.

The Results

It is being reported that in Canada, expenditures for skills training by companies has not changed for the last seven years, despite interest and the rapid technological advances in businesses. The speed and complexity of change is such that many organizations are playing catch-up to build leadership and technical capacity that they need to compete. Study results in Quinte indicated that there is an immediate need for skilled trades people such as millwrights, machinists, industrial electricians, etc. Results also demonstrated that secondary students had both a lack of awareness and a desire to learn more about manufacturing companies and the potential diversity of these careers. In fact, the demand for timely, up-to-date career information from students, parents, teachers and guidance counsellors was overwhelming. Communication is a common theme that runs through the conclusions regarding education and training. It is clear that to be successful, there must be open communication between all partners, including those in industry, secondary schools, post-secondary institutions and the manufacturing sector.

The project developed a go-forward plan that is ready for implementation. The first step to address manufacturing labour force issues was to clearly identify the local manufacturing labour force needs in the short, medium and long term. With identified labour force requirements, stakeholders can address community awareness. An important next step is the delivery of community outreach by all impacted parties that raises the awareness of local manufacturing career opportunities. There is a need to develop and foster dialogue between students and members of the manufacturing sector on a face-to-face basis, both within the educational system and within the business environment, using hands-on experiences with access to the tools of the trade.

The Accolades

The leading edge approach used in this project and the successful partnership effort is receiving positive attention and being touted as a model by governments, considered for funding for further development and implementation as well as attracting interest from other communities concerned with business and economic development. The success of this project is not due to issue identification alone, but to dealing with issues head-on and taking concrete steps to resolve them.

New Brunswick Community College – Miramichi Case Study
Animation Program ▶

When the New Brunswick Community College in Miramichi (NBCC-Miramichi) was selected as one of the top 10 new media schools in the country, Shift Magazine described it as "the best college on a world-class salmon river." Tom Knott, Head Recruiter for Warner Brothers in Los Angeles described the College's animation program as "... equal to, if not better than any animation program in the country." These accolades certainly beg the question, "how and why did a small college in a small rural community in a small province develop a world-class animation program?"

The Origin of a Unique Program

The Applied Arts and Animation program came about five years ago as a natural offshoot of a provincial initiative to train and develop people with world-class technology skills in a community with a depressed economy based almost entirely on declining natural resources – forestry and fishing. There is no question that the uniqueness of NBCC-Miramichi's animation program derives from the rural location of the college that finds itself far from the traditional animation centres such as Toronto, Montreal and Vancouver. Prior to the program's development, students in New Brunswick who were interested in pursuing a career in animation or a related industry either had to leave the province to pursue their studies, or abandon their career path.

A Strong Successful Program

The strength and success of the program lies in the dedication and expertise of the animation department's instructors, who possess prior work and supervisory experience with some of the largest and most renowned animation companies in the world, including: Nelvana, Disney, Chuck Gammage, etc. These instructors have established a program that models professional animation industry standards in terms of studio culture and expectations, technical support, and state of the art animation and production software and equipment. Despite the College's rural location, it maintains regular contact with the animation industry for advice on curriculum development, college visits and promotion of its graduating students owing to its instructors' professional experience and industry contacts.

Another unique aspect of the program is its hybrid nature. While programs at other colleges located close to animation business centres often train specialists in particular aspects of the field, NBCC-Miramichi's program provides a broader training to encompass all aspects of the industry, and includes business and entrepreneurial components. The program continues to develop, with the recent introduction of a one-year art foundation program to provide students with an opportunity to experience a broad-based visual arts program and to prepare those interested for entry to the two-year animation diploma program. A one-year post diploma program dedicated solely to computer animation is currently in development.

Let's Bring Animation to NB

Although trained graduates must still leave the province to find employment in the industry, one of the primary aims of NBCC-Miramichi is to bring the animation business to it and provide opportunities for youth to remain in the region. The College encourages entrepreneurial opportunities to develop a thriving local animation and film industry. Advances in technology, government incentives and the opportunity to establish satellite offices linked to larger companies combine to make an animation site in a rural community like Miramichi a distinct possibility. The unique nature of the College and the fact that it is situated in a small province provides close contact in working with high-ranking government officials to make this a reality. The College is currently working hand-in-hand with government on a number of promising initiatives designed to develop an animation and film industry in New Brunswick, one of which involves members of the local First Nations communities.

There is no question there are significant challenges associated with being an animation school in a rural setting in small province that has no significant animation industry to speak of. However this is also one NBCC-Miramichi's greatest strengths. Each of the animation industry guests invited to the College comment not only on the quality of its program, but also on the almost 'family' environment of the animation department. Instructors and students both thrive off of and depend on each other, and for all of them, animation is more than a pursuit, it is a passion. Although designed to assist the youth of the Miramichi region, the program's reputation is becoming increasingly widespread, resulting in increased applications from outside New Brunswick.

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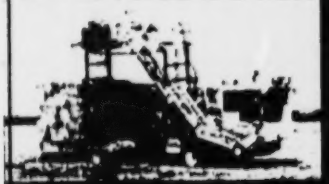
Okanagan University College computer information systems students teamed up with OptiMEDirect to develop a web-enabled practice management system for medical billing that will change the way physicians practice health care through web-accessible paperless patient records.

OUC
Okanagan University College

OptiMEDirect

Olds College worked with Transfeeder Corp. to develop an on-campus facility for the production & storage of compressed forage projects destined for Pacific Rim countries.

OLDS COLLEGE



TRANSFEEDER INC.

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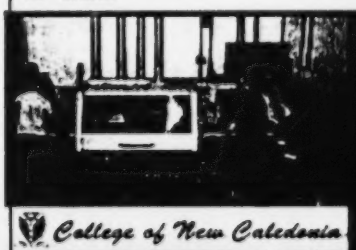
THE UNIVERSITY COLLEGE OF THE CARIBOO

For Fire-Trol Canada, **University College of the Cariboo**'s Advanced Technology Centre developed technology for mixing and loading fire retardants to combat forest fire conditions around the globe.



College of New Caledonia

The WoodTEK Business Development Centre of the **College of New Caledonia** provides technology transfer opportunities to the local BC wood processing industry.

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Superior Emergency Vehicles and **Red Deer College** have a long history of cooperation. Projects have ranged from consulting, curriculum development, and teacher training, to organizing SME conferences and building internet content for local economic development and better regional linkages.

Red Deer College

SUPERIOR Canada's Fire Truck

More than 18 southern Alberta businesses provided equipment and supplies used to build **Lethbridge Community College**'s Workplace Safety Training Facility. Many view this as an excellent investment as they send their employees for training or hire students educated at the facility.

LEARNING FOR LIFE

LETHBRIDGE COMMUNITY COLLEGE

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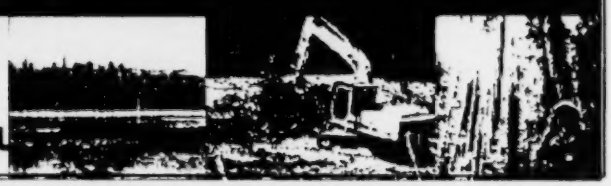
Mount Royal College's Institute for Applied Environmental Research and Innovation is working with industry to assist in the development of regionally specific, ecosystem based timber harvest plans.

MOUNT ROYAL COLLEGE



University College of the Cariboo's Advanced Technology Centre produced an automated three-axis drilling and bolting machine to manufacture large industrial mats from used tires for Kamloops-based Unique Tire. This resulted in a more satisfied work crew, reduced material costs, and virtually eliminated high employee turnover.

THE UNIVERSITY COLLEGE OF THE CARIBOO

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Okanagan University College's Technology Access Centre brings together technology businesses, academia and government to diversify the Okanagan economy by working with regional entrepreneurs and inventors as they commercialize new technologies. The Centre has been involved in environmental technologies, freshwater and watershed management, radio engineering, agri-food sciences and health sciences.

Northern Alberta Institute of Technology instructors and students worked with TRLabs and one of its members, Critical Telecom, to develop and test means to identify voice, fax and modem data being carried through networks.

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Motion Picture Arts students at **Red Deer College** produced a video featuring best practices for SME development by Superior Emergency Vehicles' for an internet magazine on the Central Alberta Economic Partnership Industry and Education Portal.

CON*NECT

CON*NECT established a partnership with Teranet to co-ordinate college-based training to support electronic land registration on a county-by-county basis across Ontario. E-reg is a government initiative that will eventually cover the entire province.

The Colleges of Ontario Network for Education and Training - CON*NECT is a marketing alliance of Ontario's 25 colleges of applied arts and technology.

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Keewatin Community College's Northern Forest Diversification Centre (NFDC) focuses on the creation of micro-enterprises to develop income for northern residents. The NFDC works in partnership with Western Economic Diversification, the Province of Manitoba (Cabinet Committee for Economic Development), The Pas Employment and Training Services, Cedar Lake and Greenstone Community Futures, Swampy Cree Tribal Council and the Portage Food Development Centre.

KEEWATIN COMMUNITY COLLEGE

Northern Forest Diversification Centre

New Brunswick Community College - Bathurst is establishing a Technology Transfer and Innovation Centre in Metallurgy to assist businesses in the metallurgy sector to adapt new technologies to their specific needs thus improving their productivity and competitiveness.

CCNB Bathurst

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College of the North Atlantic and IDON East teamed up with North Atlantic Refining (NAF) to develop a series of 70 interactive, user-friendly training modules that let employees learn about the refining process while on the job. Previously, NAF would have had to allow large blocks of time off for the employees to learn these skills off-site.

The Small & Medium-sized Enterprise Institute (SMEI) of the **University College of Cape Breton** develops an innovative repository of "best practices" of fast growth firms and markets business support services based on this information for clients located inside and outside the Atlantic region.

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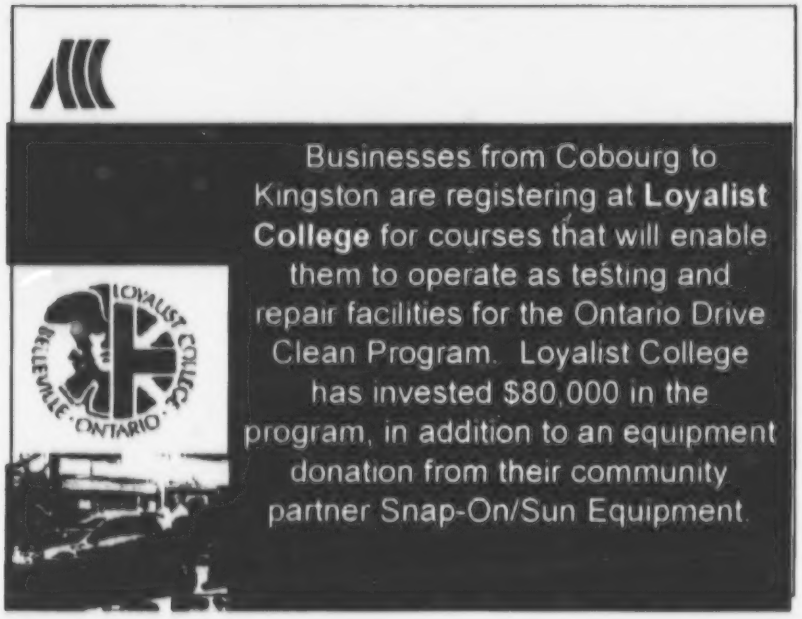
Michener
INSTITUTE
Aventis
Aventis Pasteur
Toronto-area Biotechnology firm Aventis Pasteur's involvement with the **Michener Institute**'s Applied Biotechnology began at the program design stage with the review of the curriculum. They are now a program partner, providing curriculum advice, donations of equipment and funding.


LOYALIST COLLEGE
BELLEVILLE · ONTARIO
Businesses from Cobourg to Kingston are registering at **Loyalist College** for courses that will enable them to operate as testing and repair facilities for the Ontario Drive Clean Program. Loyalist College has invested $80,000 in the program, in addition to an equipment donation from their community partner Snap-On/Sun Equipment.

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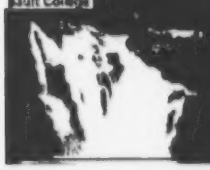
Through the NRC's Industrial Research Assistance Program, **Sault College**'s Industrial Technology Advisor brought two industrial clients to the table to use a water resources laboratory as part of a post-Walkerton training program and in support of the business development objectives of the local public utilities company.



CON*NECT

Nearly 7,500 Ontario lawyers and their staff discovered the benefits of accessing professional development opportunities by satellite in their own communities. Using the college satellite videoconferencing network as downlink facilities, **CON*NECT** has coordinated 4 satellite conferences for the Canadian Bar Association - Ontario and the Law Society of Upper Canada.

The Colleges of Ontario Network for Education and Training. CON*NECT is a marketing alliance of Ontario's 25 colleges of applied arts and technology

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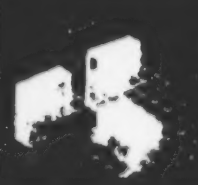
Okanagan University College collaborated on forestry-related research with Weyerhaeuser Canada, Tolko Industries Ltd., Canfor, Riverside Forest Products and Pacific Regeneration Technologies.

OUC
Okanagan University College

In partnership with Industry Canada, **Cégep André-Laurendeau** initiated the creation of the Réseau photonique de Montréal in 2000, grouping business and industry from the photonics sector in the Montréal region.



CÉGEP ANDRÉ-LAURENDEAU

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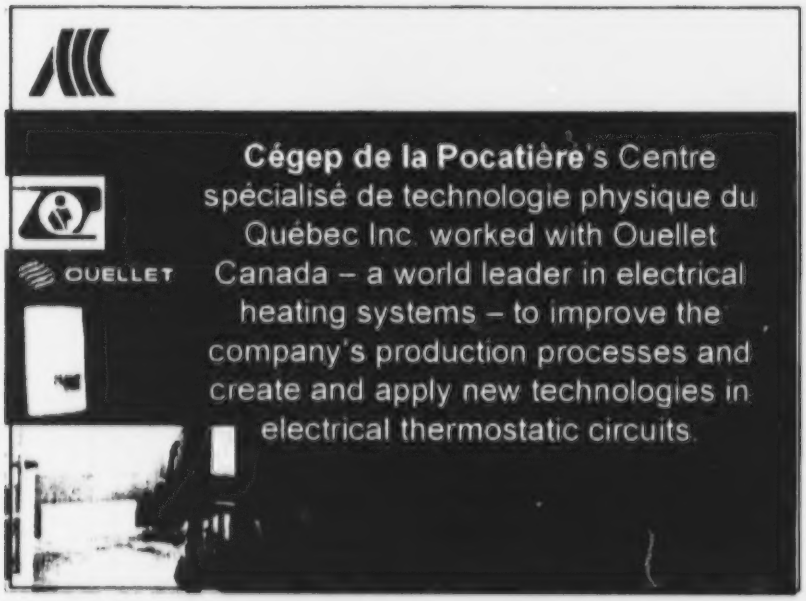
OUELLET
Cégep de la Pocatière's Centre spécialisé de technologie physique du Québec Inc. worked with Ouellet Canada – a world leader in electrical heating systems – to improve the company's production processes and create and apply new technologies in electrical thermostatic circuits.

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